IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Joar Vaage
Appl. No.:	09/936,390
Filed:	September 10, 2001
Docket No.:	1781
Conf. No.	3776
Title:	*A METHOD AND AN APPARATUS FOR STEREOPROJECTION OF PICTURES*
Art Unit:	2872
Examiner:	Chang, Audrey Y

Action: ***DECLARATION OF ANNE SOLVEIG TØNNESEN UNDER 37 C.F.R. §1.132***

Date: December 5, 2005

To: Mail Stop Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Anne Solveig Tonnesen declares as follows:

1. My name is Anne Solveig Tonnesen and I am a Program Manager at Cyviz AS, located in Stavanger Norway, which is the owner of this application. This is my second declaration in this matter.

2. I have been asked to comment about certain US patent documents which have been newly cited against the company's pending patent application, Serial No. 09/936,390, which is bears the title "A METHOD AND AN APPARATUS FOR STEREOPROJECTION OF PICTURES". It is my understanding that the Examiner handling the application at the USPTO has rejected each of the pending claims based on the assertion that the invention is obvious. More specifically, I am aware that one reference (US Patent No. 6,522,351 to Park) is being relied upon either alone or with the certain teach teachings from another reference (US Patent No. 5,416,510 to Lipton et al) to reject pending claims 13, and 15-19. I also understand that the reference to Lipton et al is alone used by the Examiner handling this application in support of her position that pending claims 25-29 are obvious.

3. I have reviewed the above patents, as well as the Examiner's most recent office action mailed on 5 August 2005 and the pending application, each in its entirety. As stated in my previous declaration, I believe that my particular knowledge, my background experience in areas relating to this invention, and my consideration of these patents qualifies me to offer the opinions in this declaration. Based on my review of these various materials, I respectfully disagree with many of the Examiner's conclusions and offer the following observations in support of patentability.

4. As before, I would like to begin by briefly discussing pertinent aspects video imaging, as well as each of the above patents, as this will provide a framework for my opinions.

5. **Video signals**: One of the standard stereoscopic video signal formats can be described as a stream of alternating image frames, so that a first and every odd numbered image is intended for a first eye (e.g. the left eye) and a second and every following even numbered picture is intended for the second eye (e.g., the right eye). In parallel with the stream of alternating left and right images, there is a synchronization signal that provides timing.

6. Stereoscopic imaging is used for the case where you see one image with the left eye and one image with the right eye and thus the brain triangulates the information to create a 3D experience which includes depth information.[1] The most common way of watching this type of stereo signals is by displaying the complete video signal as is, showing every image frame on a single display device and use active liquid crystal shutters to alternately block or open the corresponding eyes, synchronized with the synchronization signal.

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[1] Monoscopic imaging, on the other hand, is used for the case where both eyes see the same information or image and there is no depth information.

7. This technique has some limitations, one being that the frame rate handling capability of the display may cause the frequency to be limited and flicker normally occurs. Flicker can occur because of the actual display technology being used, whether a result of the displays themselves, or the polarizing Liquid Crystal Shutter glasses.

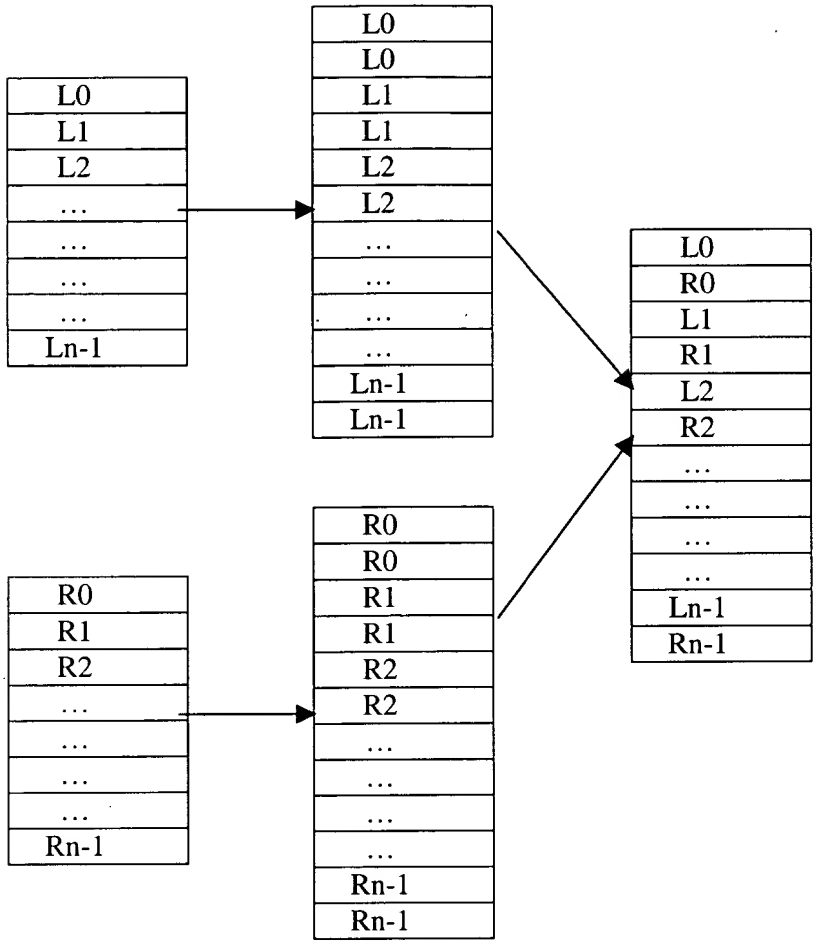
8. Another stereoscopic video signal format is to have two separate signals, one signal containing the left eye information and one signal containing the right eye information. The two video signals will then appear to be similar to a regular video signal, and can be viewed alone as a regular video signal. If you use both signals to get the stereoscopic effect, some time domain synchronization must be present.

9. This table below shows the types of stereoscopic video signal formats used in the present invention, as well as the various patents references which have been (or currently are) used reject claims of our application:

Video signal	**Display type**	**Patent**
Regular video (monoscopic)	2 projectors	Oba et al
Two separate streams	1 projector	Shikama et al Park
Two separate streams	2 projectors	Lipton et al
Two separate streams combined into 1 stream (intermediate field sequential/side-by-side format converted to a multiplexed signal)	1 projector	Lipton et al
Video signal with left and right eye information alternately	2 projectors	The present Invention
Video signal with left and right eye information alternately	1 projector*	Izawa et al

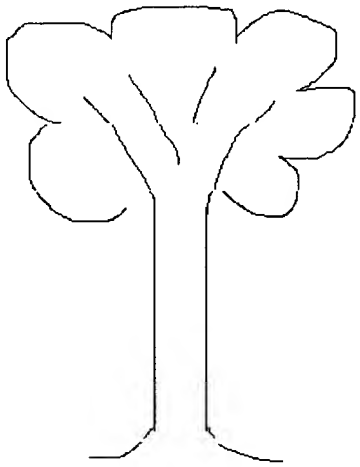
10. **U.S. Patent No. 6,522,351 to Park.** In Park there are two input camera signals, one representing the output of a left camera and one representing the output from the right camera. These two input signals are combined into one

signal as represented in the following figure, which is in accord with FIG. 5 of Park:

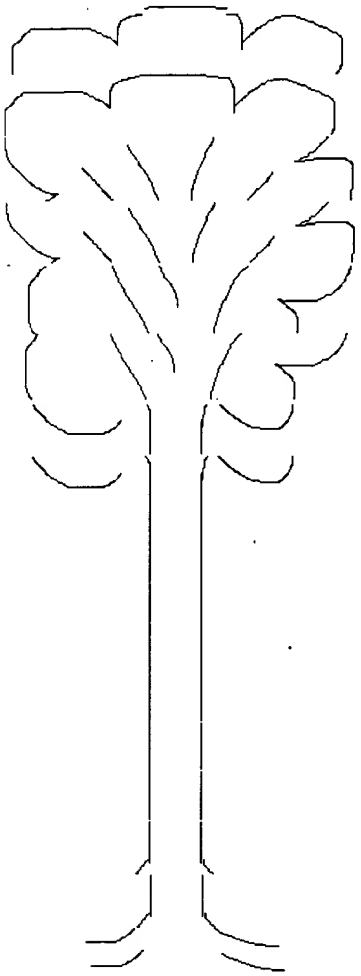


This treatment of the image signals can be illustrated by the following images:

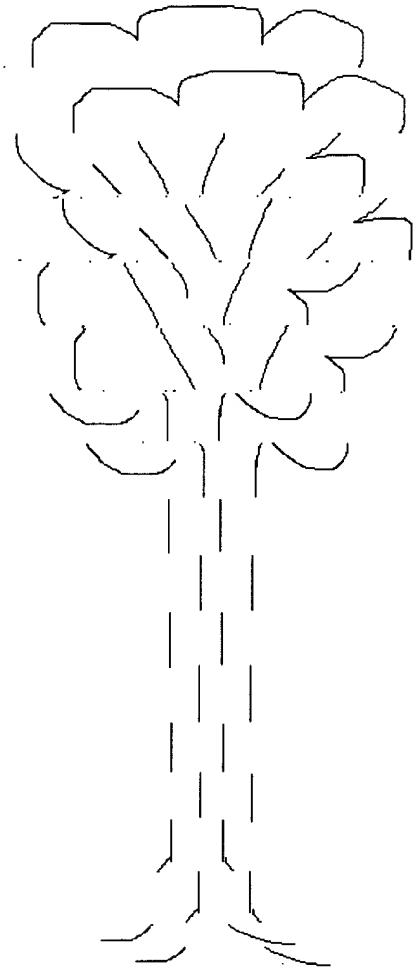
Left or right image:



Converting the image at double frequency (scanning each line twice as described in column 3, lines 39-48 in 6,522,351 Park) gives the following image:



The multiplexing section combines every second line from the left and the right image signal:



This combined image consists of all the information from both the left eye signal and the right eye signal.

11. The combined signal is then displayed with different colors to be viewed using glasses as described in US patent 5,260,773 [See Park at column 2, lines 29-32] with different color bands for the left and the right eye, so that the left eye only sees the part of the image intended for the left eye, and the right eye only sees the part of the image intended for the right eye.

12. The Examiner states on Page 5 ¶ 6. :

> **Park** teaches a method and device for stereo projection of pictures of an object (10, Figures 2-4), wherein picture signals of the object that are intended for left eye and for right eye respectively are formed and received by left and right video cameras and left and right receiving sections (100, and 110). Park teaches that the left eye and right picture signals from the cameras are converted to left eye and right eye television image signals, (such as 402 and 404 in Figure 5), and the left and right receiving sections *converts* the left and right televisions signals to left eye and right eye image signals, which means some sort of "decoding" function is performed. It is also implicitly true that certain picture storages for the left and right image signals are needed for storing the left and right eye image signals such that *repeated scanning* or periodical scanning the storages with the left and right eye image signals is performed, (double scanning sections 122 and 124, or 212 and 214 or 312 and 314, in Figures 2-4), to generate the double scanned image signals which are consequently transmitted to the projector for projection.

13. I wish to point out that repeated scanning in Park is described as scanning each horizontal line twice creating an intermediate picture that is not suitable for projection. The repeated scanning is followed by an alternating selection of a

horizontal line from the intermediate left and right double-scanned image signals to create a multiplexed image.[2]

14. The Examiner goes on to state with respect to Park:

> This reference has met all the limitation of the claims with the exception that it does not teach explicitly that the incoming left and right eye pictures are formed in cyclically format with odd and even number pictures and with odd numbered pictures being transmitted to a first projector and the even numbered pictures being transmitted to a second projector.

15. I wish to emphasize that there are fundamental differences between the incoming picture signals in Park and the present invention which seem to be glossed over by the Examiner. In the case of Park there are two cameras filming a left eye signal and a right eye signal, whereas in our invention the incoming picture signal contains both the left and right eye picture signals in one path, organized so that every odd numbered picture is intended for the left eye and the even numbered picture is intended for the right eye. The splitting or sorting of the incoming signal into two different paths is not discussed in Park. The resulting stereoimage is displayed on one projector in Park, with every second line intended for the left or the right eye, whereas in our invention the image is shown on two projectors.

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[2] I wish to also point out that there appears to be a discrepancy between the description of Fig. 5 (column 3, lines 60-65) and synthesized image signal 420 which is represented in the Figure. The text states that the synthesized image signal 420 has n image lines, whereas the figure indicates 2n horizontal lines. According to the description of method being used, the figure seems to be the correct version, suggesting 2n horizontal lines and no loss of image information. With only n lines, half of the lines from the left and right eye image signals would be lost, and the double scanning described would be of no benefit. Additionally, if the resulting image only has n lines, then the method would be similar to that described by Shikama et al..

16. The Examiner continues on to state:

> However Park does teach explicitly that the left eye picture and the right eye picture are *separated* stored, decoded and scanned, whether to make them coming in cyclical form or not does not differentiate the method of projection of the left and right eye stereoscopic image of the object.

17. The Examiner may be correct to assume that Park teaches the left eye pictures and the right eye pictures to be separately stored, but they are not separated and then separately stored, as in our invention. Before a decoding and storage takes place in our invention, the left eye pictures are separated from the right eye pictures and transferred to different picture storages. These pictures are then projected so that what is stored is what is projected. In Park, on the other hand, storage is presumably accomplished by the receiving sections 112 and 114 in the embodiment of Fig. 2. The receiving circuit generates and stores the L and R image signals which are transformed by the double scanning circuit before projection. (Fig. 5 and Col. 3, lines 50-60) Thus, what goes in is different than what comes out. The Examiner states that Park "does teach explicitly that the left eye picture and the right eye pictures are separated, stored, decoded and scanned . . . " However, since there are 2 cameras in Park, there is no need to decode at this point to separate out the left from the right image signals.

18. Park's scanning is also different than the present invention. Park describes a double scanning of each horizontal line inside the image to double the number of lines in the pictures. After this has happened both for the left eye image and the right

eye image, there is a multiplexing section which alternately selects a line from the left and right double-scanned image signals to produce a multiplexed double-scanned image signal.

19. In contrast, the scanning performed in our invention is performed in the left and right channels, respectively, and the periodic scanning refers to areas scanned inside the left or right picture storage, and includes scanning complete picture frames.

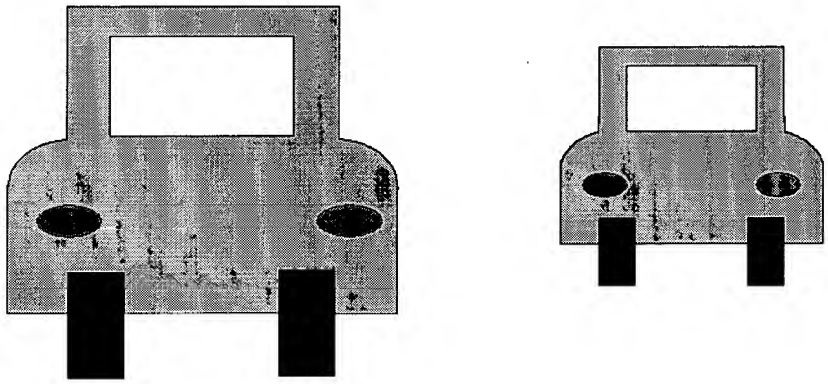
20. The Examiner goes on to state:

> One skilled in the art certainly can make the cameras (102 and 104) take the left and right eye pictures of the object in a time sequential manner in order for the odd numbers of the pictures representing the left eye pictures and even number of the pictures representing right eye picture for the benefit of reducing the number of the incoming pictures needed for achieving the projection.

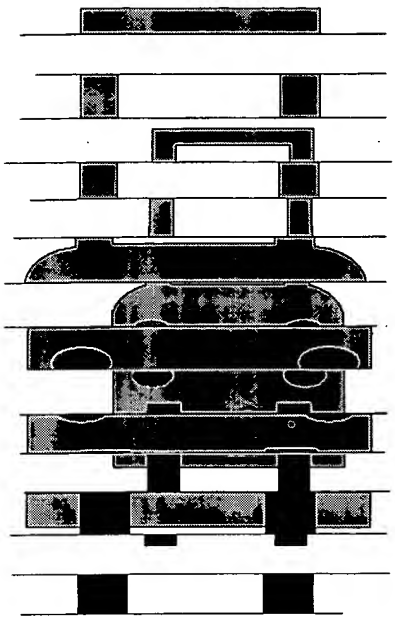
21. If we do as the Examiner suggests – that is, make the cameras (102 and 104) take the left and right eye pictures of the object in time sequential manner in order for the odd numbers of the pictures representing the left eye pictures and even number of the pictures representing right eye picture for the benefit of reducing the number of the incoming pictures needed for achieving the projection, then we would receive an unfavorable result using the method of Park. As the two picture signals are combined and multiplexed so that the projected image consists of timed information with every second line from the left image signal and the right image signal, we would end up with a picture projected at the same time, that was taken at different times.

22. To illustrate visually, ff we consider a sequence of a car driving away from us. Then the first image may look like the big car on the left, and the second image will look like the smaller car on the right

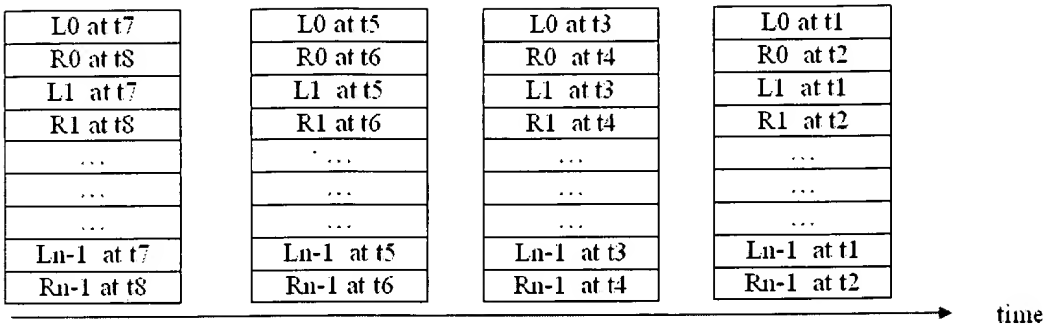
side.



23. If we now apply the approach suggested from the examiner and run the signal through using the method described in Park, the resulting image would look like this:

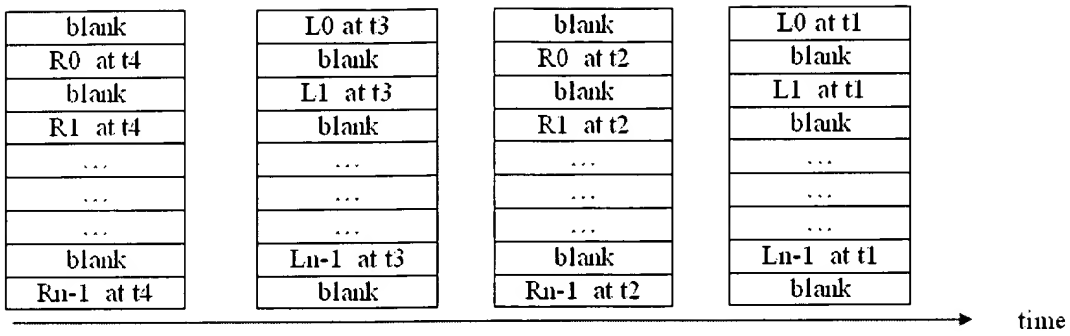


24. As we can see, every second line of picture information is taken from the left camera and the right camera, but the pictures at taken at different times, giving the car time to move further away in the case of the right camera (second picture). As can be clearly understood from this image, the method of Park does not work properly with this approach. You can also see a corresponding schematic view of the combined information in the next figure, where the notions t0, t1 etc. indicate pictures taken at different times. The odd numbered pictures will be pictures at t1, t3, t5, t7 etc and the even numbered pictures will be pictures t2, t4, t6, t8 etc.



25. It is, therefore, my opinion that sending the information from the two cameras in a time sequential manner into the device as taught by Park, we would not get a sensible result.

26. Alternatively, if a picture is only sent from the left camera at t1 and a picture from the right camera at t2, and this continues in a time sequential manner, then the result could in principle become a time sequential video signal output using the method described in Park. However, such a procedure would be unnecessary complicated because Park's use of double scanning would greatly reduce picture quality since every second line in the resulting image would be blank as shown below.



27. Using this method will reduce the number of incoming pictures, but it will also eliminate the need for the processing described in Park since there would be no need for scanning every second line to create an image with every second line from each picture frame, which I believe is important to Park's invention. Basically Park's invention would be reduced to an active stereosystem, with half the line resolution using this method.

28. In the office action, the Examiner also states:

> Park teaches that the left and right images are alternately transmitted (130, Figure 2) to the projection device, but it does not teach explicitly in this embodiment to use two projectors one for projecting the left eye picture image signals one for projecting right eye image signals.

I disagree. Actually, Park teaches that the left and right images are multiplexed and displayed interlaced on the projector, meaning that every second line contains either the left eye image information or the right eye image information. This is simply not the same as alternately transmitting the images.

29. The Examiner also states:

> Park however teaches it is known in the art to use two projectors for such stereo projection, (please see fig. 1). Lipton et al in the same field of endeavor teaches explicitly that left eye and right eye pictures of an object obtained by a pair of cameras (120 and 121, Fig. 1C) can be transmitted to right and left projectors (404 and 403, Fig. 4) respectively via recorder and display controller to make the right pictures being projected by the right projector and the left pictures being projected buy the left projector for the benefit of using a pair of projectors that allows simultaneous projections of the left and right eye pictures without time delay.

I do not disagree with this statement.

30. The Examiner continues:

> With regard to claim 17, the left double scanning section and the right double scanning section taught by Park serve as the first and second picture generator.

The left and right double scanning sections taught by Park and the picture generators in our inventions have different functions, so I believe it is improper for the Examiner to consider Park's double scanning sections to be equivalent to our picture generators. The double scanning sections in Park duplicate each horizontal line, but our picture generators scan periodically the different areas in the picture storage for complete picture frames to send the resulting image to the respective projectors. In addition, Park's double scanning circuits are not coupled to projectors, but instead to the multiplexing section 130. Therefore, the result of Park's double scanning sections is to create an intermediate images which are not suitable for direct projection, where the results of our picture generators are ready for projection.

31. The Examiner also states:

> With regard to claim 18, the double scanning section allows scanning of the image signals at a rate different from the incoming rate of the incoming picture signal.

I also do not disagree with this statement by the Examiner.

32. In section 7 of the Office Action the Examiner states:

> Lipton et al teaches a device for stereo projection of pictures having a pair of cameras (120 and 121, fig 1C) for producing left eye picture intended for left eye and right eye picture intended for right eye and the device further comprises recorder and display controller (401 and 402, fig 4) for selecting the left eye picture signal and directs it via a first optical path to a left projector and for selecting the right eye picture signal and directs it via a second optical path to a right projector for stereoscopic projection. This implies that display controller must include a certain page selector for selecting the left eye and right eye picture signals from the recorder.

33. **U.S. Patent No. 5,416,510 to Lipton et al.** According to Lipton et al's explanation of the preferred embodiments in column 8 lines 30 onwards the two signals are stored in memory and operated on topologically to produce a multiplexed signal which would have the appearance as shown in Lipton et al's Fig.2 if displayed on a conventional monitor, or directly onto a standard projector. Figure 2 shows a multiplexed image where the left eye and right eye pictures are stored as adjacent images within one picture frame (side-by-side format). The separation of the images into a left and a right path would therefore be a decoupling and demultiplexing rather than a mere page selection process which is performed in our invention. The description of Lipton et al's Fig. 3 talks about making the side-by-side format into a time sequential format to be displayed on a single projector. The description of Fig. 4

as mentioned by the Examiner mentions how the side-by-side format is separated into a left and a right image signal by the display controller 402. The display controller can not select complete frames, as each frame consist of both left eye and right eye information, hence it can not work as a page selector.

34. Finally, the Examiner states with respect to Lipton et al.:

> This reference has met all the limitations of the claims. It however does not teach explicitly that the page selector has a control unit adapted to sense the incoming left and right picture signals. But such control unit is either implicitly included for making the right eye and left eye picture signal *properly* being selected and directed to the respective projectors respectively or it is an obvious modification to one skilled in the art to *ensure* the selection and the transmission of the picture signals to the proper projectors be proper for achieving the stereoscopic image display.

As discussed above, since Lipton et al describes a different method in which two signals are operated on topologically to produce a multiplexed signal, there is no need for a page selector. Since there is no page selector in Lipton et al., it follows that there is no control unit assigned to it.

I, the undersigned, being hereby warned that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, declares that the facts set forth in this declaration are true, all statements made of my own knowledge are true, and all statements made on information and belief are believed to be true.

Further declarant sayeth not.

Dated: 5. DEC. 2005 By: _____
Anne Solveig Tonnesen